WHAT IS CLAIMED IS:

1   1. A method for encoding data channels in a CDMA system having data channel

2   interference cancellation, comprising the steps of:

3   identifying a non-orthogonal pilot signal using a channel code;

4   mixing a data signal having an in-phase portion and a quadrature portion

5   with a specific user channel code;

6   producing resultant signals using an output signal which is generated

7   during mixing of the data signal;

8   modulating the resultant signals using a PN code;

9   baseband discriminating the in-phase and the quadrature phase portions

10   of the data signal to produce second resultant signals;

11   modulating the discriminated in-phase portion and quadrature phase

12   portion of the data signal;

13   forming a composite output signal; and

14   transmitting the composite output signal to a base station.

1   2. The method of claim 1, wherein said identifying step comprises the step of:

2   modulating the non-orthogonal signal using the channel code.

1   3. The method of claim 1, wherein said mixing step comprises the step of:

2   modulating the data signal using the specific user channel code.

1   4. The method of claim 1, wherein said producing step comprises the step of:

2   summing output signals at a node in the CDMA system.

1   5. The method of claim 1, wherein said baseband discriminating step comprises the

2 step of:

3   spreading the in-phase portion and the quadrature phase portion of the

4   data signal.

1   6. The method of claim 5, wherein said spreading step comprises the step of:

2   modulating the in-phase portion and the quadrature phase portion of the

3   data signal using channel separation signals.

1   7. The method of claim 6, wherein said separation signals are orthogonal functions.

1   8. The method of claim 1, wherein said modulating the discriminated in-phase portion

2 and quadrature phase portion of the data signal comprises the step of:

3   modulating the discriminated in-phase portion and the discriminated

4   quadrature phase portion of the data signal using respective cosine and sine

5   functions.

1   9. The method of claim 1, wherein said forming step comprises the step of:

2   summing the second resultant signals.

1   10. An apparatus for encoding data channels in a CDMA system having data channel

2 interference cancellation, comprising:

3   means for identifying a non-orthogonal pilot signal using a channel code;

4   means for mixing a data signal having an in-phase portion and a

5   quadrature portion with a specific user channel code;

6   means for producing resultant signals using an output signal which is

7   generated during mixing of the data signal;

8	means for modulating the resultant signals using a PN code;
9	means for baseband discriminating the in-phase portion and the
10	quadrature phase portion of the data signal to produce a resultant signal;
11	means for modulating the discriminated in-phase portion and quadrature
12	phase portion of the data signal; and
13	means for forming a composite output signal.

1	11. A method for decoding data channels in a CDMA system having data channel
2	interference cancellation, comprising the steps of:
3	receiving a composite signal at a base station;
4	decoding the composite signal to generate first resultant signals;
5	demodulating the first resultant signals using a PN code to generate
6	second resultant signals;
7	demodulating the second resultant signal using channel separation
8	functions to generate demodulated resultant signals;
9	mixing the demodulated resultant signal with channel code data;
10	filtering mixed demodulated resultant signals to generate demodulated
11	data signals and a demodulated non-orthogonal pilot signal;
12	filtering the non-orthogonal pilot signal to remove interference;
13	generating pilot signal interference terms;
14	subtracting the pilot signal interference terms from the data signal; and
15	performing a dot product calculation using the filtered non-orthogonal
16	pilot signal and in-phase sub-band portions and quadrature sub-band portions of
17	the data signals to generate a decoded composite output signal.

1   12. The method of claim 11, wherein said decoding step comprises the step of:

2   demodulating the composite signal using respective cosine and sine

3   functions.

1   13. The method of claim 11, wherein said demodulating the second resultant signal

2   step comprises the steps of:

3   despreading the second resultant signal with respect to the in-phase

4   sub-band portions and quadrature sub-band portions of the data signal using a

5   first channel separation signal and a second channel separation signal,

6   respectively; and

7   despreading the second resultant signal with respect to the in-phase

8   sub-band portions and the quadrature sub-band portions of the data signal using

9   a third channel separation signal.

1   14. The method of claim 13, wherein the second channel separation signal is a complex

2   conjugate of the first channel separation signal.

1   15. The method of claim 14, wherein the first channel separation signal and the seond

2   channel separation signal are orthogonal functions.

1   16. The method of claim 11, wherein said mixing step comprises the steps of:

2   demodulating non-orthogonal pilot signal components of the demodulated

3   resultant signals using the channel code data; and

4   demodulating in-phase sub-band portions and quadrature sub-band

5   portions of the demodulated data signal using a specific user channel code.

1   17. The method of claim 11, wherein said filtering step comprises the step of:

2   performing an integration and dump.

1   18. The method of claim 17, wherein said integration and dump comprises the steps

2 of:

3   comparing code lengths of the demodulated data signals to each other;

4   multiplying matching code lengths of the demodulated data signals; and

5   integrating multiplied and matched code lengths of the demodulated data

6 signals.

1   19. The method of claim 11, wherein said step of generating pilot signal interference

2 terms comprises the steps of:

3   modulating the demodulated non-orthogonal pilot signal, using the

4 channel code data to generate resultant output signals; and

5   modulating the resultant output signal, using a specific channel code of

6 a user to generate a first pilot signal interference term and a forth pilot signal

7 interference term.

1   20. The method of claim 19, further comprising the steps of:

2   subsequent to modulating the resultant output signals, using a specific

3 channel code of a user, modulating the resultant output signals using a first

4 channel separation signal and a second channel separation signal to generate a

5 second pilot signal interference term and a third pilot signal interference term.

1   21. The method claim 19, wherein the first channel separation signal and the second

2 channel separation signal are orthogonal functions.

1   22. The method of claim 11, wherein said step of performing a dot product calculation

2   comprises the steps of:

3   modulating cosine portions of the in-phase sub-band portions and cosine

4   portions of the quadrature sub-band portions of the data signal, using a cosine

5   portion of the demodulated non-orthogonal pilot signa to generate resultant

6   cosine in-phase sub-band portions and resultant cosine quadrature sub-band

7   portions;

8   modulating sine portions of the in-phase sub-band portions and sine

9   portions of the quadrature sub-band portions of the data signal using a sine

10   portion of the demodulated non-orthogonal pilot signal to generate resultant sine

11   in-phase sub-band portions and resultant sine quadrature sub-band portions;

12   summing the resultant cosine in-phase sub-band portions and the

13   resultant sine in-phase sub-band portions to generate a first composite signal

14   portion;

15   summing the resultant cosine quadrature sub-band portions and the result

16   sine portions of the quadrature sub-band portions to generate a second

17   composite signal portion; and

18   outputting the first composite signal portion and the second composite

19   signal portion as the decoded composite output signal.

1   23. An apparatus for decoding data channels in a CDMA system having data channel

2   interference cancellation, comprising the steps of:

3   means for receiving a composite signal at a base station;

4   means for decoding the composite signal to generate first resultant

5   signals;

6   means for demodulating the first resultant signals using a PN code to

7   generate second resultant signals;

1   means for demodulating the second resultant signal using channel

2 separation functions to generate demodulated resultant signals;

3   means for mixing the demodulated resultant signal with channel code

4 data;

5   means for filtering mixed demodulated resultant signals to generate

6 demodulated data signals and a demodulated non-orthogonal pilot signal;

7   means for filtering the non-orthogonal pilot signal to remove

8 interference;

9   means for generating pilot signal interference terms;

10   means for subtracting the pilot signal interference terms from the data

11 signal; and

12   means for performing a dot product calculation using the filtered

13 non-orthogonal pilot signal and in-phase sub-band portions and quadrature

14 sub-band portions of the data signals to generate a decoded composite output

15 signal.

1 24. A method for encoding/decoding data channels in a CDMA system having data

2 channel interference cancellation, comprising the steps of:

3   modulating a non-orthogonal pilot signal using a channel code;

4   modulating a data signal using a specific user channel code;

5   summing the modulated data signal and the modulated pilot signal to

6 obtain resultant signals;

7   modulating the resultant signals using a PN code;

8   spreading the modulated resultant signals using channel separation

9 signals;

10   modulating spread modulated resultant signals using respective cosine

11 and sine functions;

12	summing the spread modulated signals to form a composite output
13	signal;
14	transmitting the composite output signal to a base station;
15	receiving the transmitted composite output signal at a transceiver;
16	demodulating received composite signal using the respective cosine and
17	sine functions to generate a demodulated composite signal;
18	demodulating the demodulated composite output signal using a PN code;
19	demodulating the demodulated composite output signal using channel
20	separation functions to obtain demodulated resultant signals;
21	demodulating the demodulated resultant signals using the respective
22	cosine and sine functions;
23	filtering the demodulated resultant signals to generate a demodulated data
24	signal and a demodulated non-orthogonal pilot signal;
25	filtering the non-orthogonal pilot signal to remove interference;
26	generating first, second, third and forth pilot signal interference terms;
27	subtracting the first, second, third and forth pilot signal interference
28	terms from the data signal; and
29	performing a dot product calculation to generate an in-phase sub-band
30	data signal and a quadrature sub-band data signal.